

104.10 - Light Stable Isotopic Materials (gas, liquid and solid forms)

These RMs are for calibration of isotope-ratio mass spectrometers and associated sample preparation systems. They are distributed by NIST on behalf of the International Atomic Energy Agency (IAEA). At the request of the IAEA, quantities of these materials are limited to *one unit of each RM per laboratory every 3 years*.

The isotopic compositions are given in parts per thousand difference from isotope-ratio standards-Hydrogen and oxygen: Vienna Standard Mean Ocean Water (VSMOW), Carbon: Vienna PeeDee Belemnite (VPDB), Nitrogen: atmospheric N₂ (Air), Silicon: NBS28 Silica Sand (optical), and Sulfur: Vienna Canyon Diablo Troilite (VCDT). In RM 8545 (LSVEC) is also expressed as an absolute isotopic ratio.

For further information see: [SP260-149](#)

PLEASE NOTE: The tables are presented to facilitate comparisons among a family of materials to help customers select the best SRM for their needs. For specific values and uncertainties, the certificate is the only official source.

(see Certificate of Analysis for uncertainties and other details)

SRM	Description	Unit Size	$\delta^{13}\text{C}_{\text{VPDB}} \times 1000$	$\delta^{15}\text{N}_{\text{Air}} \times 1000$	$\Delta^{17}\text{O}_{\text{VSMOW}}$	$\delta^{18}\text{O}_{\text{VPDB}} \times 1000$	$\delta^{18}\text{O}_{\text{VSMOW}} \times 1000$	$\delta^{2}\text{H}_{\text{VSMOW}} \times 1000$	$\delta^{30}\text{Si}_{\text{NBS28}} \times 1000$	$\delta^{34}\text{S}_{\text{VCDT}} \times 1000$	$\delta_{\text{Li}}/\text{Li}$
8535a	VSMOW2 Vienna Standard Mean, Ocean Water	20 mL				-24.8 Ref [2]	-190 Ref [2]				
8536	GISP-Water	20 mL				-55.5 Ref [1]	-428* Ref [1]				
8537	SLAP-Water Light Stable Isotopic Standard	20 mL									
8538	NBS30-Biotite	2 g				+5.1 Ref [6]	-66 Ref [2]				
8539	NBS 22-Oil	1 mL	-30.03 Ref [5]								
8540	PEFI-Polyethylene Foil	mg	-32.15 Ref [5]								
8541	USGS24-Graphite	0.8 g	-16.05 Ref [5]								
8542	Sucrose ANU-Sucrose	1 g	-10.45 Ref [5]								
8543	NBS18-Carbonate	0.4 g	-5.01 Ref [5]			-23.01 Ref [14]	+7.20 Ref [15]				
8544	NBS19-Limestone	0.4 g	+1.95* Ref [16]			-2.2* Ref [16]	+28.65 Ref [15]				
8545	LSVEC-Lithium Carbonate	0.4 g	-46.6* Ref [5]			-26.41 Ref [14]	+3.69 Ref [15]				0.08215** Ref [4]
8546	NBS28-Silica Sand	0.4 g					+9.58 Ref [2]		0* Ref [12]		
8547	IAEAN1-Ammonium Sulfate	0.4 g		+0.43* Ref [7]							
8548	IAEAN2-Ammonium Sulfate	0.4 g		+20.41 Ref [7]							
8549	IAEA-NO ₃ Nitrogen and Oxygen Isotopes in Nitrate	0.4 g		+4.7 Ref [7]	-0.2 Ref [17]		+25.6 Ref [8]				
8550	USGS25-Ammonium Sulfate	0.5 g		-30.41 Ref [7]							
8551	USGS26-Ammonium Sulfate	0.5 g		+53.75 Ref [7]							
8552	NSVEC-Gaseous Nitrogen	300 μmol		-2.78 Ref [7]							
8553	Soufre De Lacq-Elemental Sulfur	0.5 g							+16.90 Ref [10]		
8554	NZ1-Silver Sulfide	0.5 g							-0.3* Ref [11]		

(see Certificate of Analysis for uncertainties and other details)

SRM	Description	Unit of Issue	$\delta^{13}\text{C}_{\text{VPDB}} \times 1000$	$\delta^{15}\text{N}_{\text{Air}} \times 1000$	$\Delta^{17}\text{O}_{\text{VSMOW}}$	$\delta^{18}\text{O}_{\text{VPDB}} \times 1000$	$\delta^{18}\text{O}_{\text{VSMOW}} \times 1000$	$\delta^{2}\text{H}_{\text{VSMOW}} \times 1000$	$\delta^{30}\text{Si}_{\text{NBS28}} \times 1000$	$\delta^{34}\text{S}_{\text{VCDT}} \times 1000$	$\delta_{\text{Li}}/\text{Li}$
8555	NBS2-Silver Sulfide	0.5 g								+22.67 Ref [12]	
8556	NBS123-Sphalerite	1.5 g								+17.44 Ref [13]	
8557	NBS127-Barium Sulfate	0.5 g					+8.6 Ref [8]			+21.1 Ref [12]	
8558	USGS32 Nitrogen and Oxygen Isotopes in Nitrate	0.9 g		+180* Ref [7]			+25.7 Ref [8]				
8559	Natural Gas, Coal Origin	cyl	-29.0(CH ₄) Ref [3]						-138(CH ₄) Ref [3]		
8561	Natural Gas, Biogenic	cyl	-72.8(CH ₄) Ref [3]						-176(CH ₄) Ref [3]		
8562	CO ₂ -Heavy, Paleomarine Origin	set (2)	-3.72 Ref [5]			-18.49 Ref [14]	+11.86 Ref [15]				
8563	CO ₂ -Light, Petrochemical Origin	set (2)	-41.59 Ref [5]			-33.52 Ref [14]	-3.64 Ref [15]				
8564	CO ₂ -Biogenic, Modern Biomass Origin	set (2)	-10.45 Ref [5]			-10.09 Ref [14]	+20.52 Ref [15]				
8568	USGS34 Nitrogen and Oxygen Isotopes in Nitrate	0.9 g		-1.8 Ref [8]	-0.1		-27.9 Ref [8]				
8569	USGS35 Nitrogen and Oxygen Isotopes in Nitrate	0.9 g		+2.7 Ref [8]	+21.6 Ref [17]		+57.5 Ref [8]				
8573	USGS40-Light Carbon and Nitrogen Isotopes in L-glutamic Acid	1 g	-26.39 Ref [12]	-4.52 Ref [1,2]							
8574	L-glutamic Acid USGS41 (Heavy Carbon and Nitrogen Isotopes in L-glutamic Acid)	0.5 g	+37.63 Ref [12]	+47.57 Ref [1,2]							

* Exact values defining the delta scale

^a Interim consensus values used for scale normalization

^{**}Absolute isotope amount ratio

Certified values are normal font.

Reference values are italicized.

Values in parentheses are for Information only.

References

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